IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Claim 1 (Currently Amended): An ultrasonic vibration element comprising:

a single-crystal piezoelectric member cut like an array; and

a lower resin layer which is formed on a lower surface of the piezoelectric member and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, and functions as an electrode~~ and a cutting characteristic and electrical conductivity so as to function as an electrode, the lower surface being an opposite side of an acoustically emitting side.

Claim 2 (Currently Amended): An ultrasonic probe comprising an ultrasonic vibration element constructed by a 1-3 or 2-2 type composite piezoelectric member including a piezoelectric member formed of solution-based single-crystal containing at least plumbum titanate, and a lower resin layer which is formed on a lower surface of the piezoelectric member and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, and functions as an electrode~~ and a cutting characteristic and electrical conductivity so as to function as an electrode, the lower surface being an opposite side of an acoustically emitting side.

Claim 3 (Currently Amended): The probe according to claim 2, ~~wherein the at least one of the~~ further comprising an upper resin layer which is formed on an upper surface of the piezoelectric member, the upper surface being the acoustically emitting side; and

wherein the lower resin layer has acoustic impedance of ~~2MRayl~~ 2×10^6 g/m^2 to ~~10MRayl~~ to 10×10^6 g/m^2 and functions as an acoustic matching layer.

Claim 4 (Withdrawn): A method of manufacturing an ultrasonic probe, comprising:

a first step of forming a resin layer on at least one of upper and lower surfaces of a single-crystal piezoelectric member, the resin layer having smaller acoustic impedance than the single-crystal piezoelectric member;

a second step of cutting the single-crystal piezoelectric member and the resin layer, thereby to form a plurality of kerfs; and

a third step of filling the plurality of kerfs with resins.

Claim 5 (Withdrawn): The method according to claim 4, wherein the plurality of kerfs are formed like a grid in the second step.

Claim 6 (Withdrawn): The method according to claim 4, further comprising a fourth step of polishing the resin layer to remove the resin layer.

Claim 7 (Withdrawn): A method of manufacturing an ultrasonic probe, comprising:

a first step of adhering a plurality of single-crystal piezoelectric members to a resin sheet;

a second step of cutting the piezoelectric single-crystal members and the resin sheet, thereby to form a plurality of kerfs; and

a third step of filling the plurality of kerfs with resins.

Claim 8 (Currently Amended): An ultrasonic probe comprising:

a plurality of piezoelectric members formed of solution-based single-crystal containing at least plumbum titanate, and arranged like an array;

a first electrode formed on a lower surface of each of the piezoelectric members, the lower surface being an opposite side of an acoustically emitting side;

a backing member which supports the plurality of piezoelectric members;

and

a first flexible printed wiring board which is arranged between the first ~~electrodes~~ electrode and the backing member, includes a plurality of first pattern wires each having a width smaller than a width of each of the piezoelectric member in a longitudinal direction of the ultrasonic probe, extending in a longitudinal direction of each of the piezoelectric members and connected to the first electrode along the longitudinal direction of each of the piezoelectric members, and connects the plurality of pattern wires to an ultrasonic diagnosis apparatus body.

Claim 9 (Currently Amended): The ultrasonic probe according to claim 8, further comprising:

a second electrode formed on an upper surface of each of the piezoelectric members, the upper surface being the acoustically emitting side; and

a second flexible printed wiring board including a plurality of second pattern wires each having a width smaller than a width of each of the piezoelectric member in the longitudinal direction of the ultrasonic probe, and connecting the plurality of second pattern wires to ground.

Claim 10 (Withdrawn): A method of manufacturing an ultrasonic probe, comprising:

a first step of adhering a flexible printed wiring board and a single-crystal

piezoelectric member to each other, the flexible printed wiring board having conductive layers each having a predetermined width, which are patterned in parallel on a resin member; and

a second step cutting the flexible panted wring board and the single-crystal piezoelectric member together, along and between the conductive layers, thereby to form a piezoelectric vibration element array having a width smaller than a width of each of the conductive layers.

Claim 11 (Currently Amended): An ultrasonic probe comprising:

a plurality of piezoelectric members formed of solution-based single-crystal comprising at least plumbum titanate, and arranged like an array;

a first electrode formed on a lower surface of each of the piezoelectric members, the lower surface being an opposite side of an acoustically emitting side;

a backing member which supports the plurality of piezoelectric members;

a first flexible printed wiring board which is arranged between the first ~~electrodes~~ electrode and the backing member, includes a plurality of first pattern wires each having a width smaller than a width of each of the piezoelectric member in a longitudinal direction of the ultrasonic probe, extending in a longitudinal direction of each of the piezoelectric members and connected to the first electrode along the longitudinal direction of each of the piezoelectric members, and connects the plurality of first pattern wires to an ultrasonic diagnosis apparatus body;

a second electrode formed on an upper surface of each of the piezoelectric members, the upper surface being the acoustically emitting side; and

a second flexible printed wiring board including a plurality of second pattern wires each having a width smaller than a width of each of the piezoelectric member in a

longitudinal direction of the ultrasonic probe and which connecting a plurality of the second pattern wires to ground.

Claim 12 (Currently Amended): An ultrasonic vibration element comprising:

a single-crystal piezoelectric member cut like an array; and

a lower resin layer which is formed on a lower surface of the piezoelectric member and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, functions as an electrode, has an acoustic impedance of 2 MRayl to 10 MRayl, and functions as a an acoustic matching layer~~ a cutting characteristic and electrical conductivity so as to function as an electrode, an acoustic impedance of 2×10^6 g/m^2 to 10×10^6 g/m^2 and functions as an acoustic matching layer, the lower surface being an opposite side of an acoustically emitting side.

Claim 13 (Currently Amended): An ultrasonic probe comprising:

an ultrasonic vibration element constructed by a 1-3 or 2-2 type composite piezoelectric member including,

a piezoelectric member formed of solution-based single-crystal comprising at least plumbum titanate, and

a lower resin layer which is formed on a lower surface of the piezoelectric member and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, functions as an electrode, has an acoustic impedance of 2MRayl to 10MRayl, and functions as a an acoustic matching layer~~ a cutting characteristic and electrical conductivity so as to function as an electrode, an acoustic impedance of 2×10^6 g/m^2 to 10×10^6 g/m^2 and functions as an acoustic matching layer, the lower surface being an opposite side of an acoustically emitting side.

Claim 14 (Currently Amended): The ultrasonic probe according to claim 1, wherein the plurality of first pattern wires extend along an entire length of the piezoelectric member.

Claim 15 (Currently Amended): The ultrasonic probe according to claim 8, further comprising an upper resin layer which is formed on an upper surface of the piezoelectric member, the upper surface being the acoustically emitting side, and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, and functions as an electrode~~ and a cutting characteristic and electrical conductivity so as to function as an electrode.

Claim 16 (Currently Amended): The ultrasonic probe according to claim 2, further comprising an upper resin layer which is formed on an upper surface of the piezoelectric member, the upper surface being the acoustically emitting side, and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, functions as an electrode, has an acoustic impedance of 2MRayl to 10MRayl, and functions as a an acoustic matching layer~~ a cutting characteristic and electrical conductivity so as to function as an electrode, an acoustic impedance of 2×10^6 g/m^2 to 10×10^6 g/m^2 and functions as an acoustic matching layer.

Claim 17 (Currently Amended): The ultrasonic probe according to claim 12, further comprising an upper resin layer which is formed on an upper surface of the piezoelectric member, the upper surface being the acoustically emitting side, and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, functions as an electrode, has an acoustic impedance of 2 MRayl to 10~~

~~MRayl, and functions as a an acoustic matching layer~~ a cutting characteristic and electrical conductivity so as to function as an electrode, an acoustic impedance of 2×10^6 g/m^2 to 10×10^6 g/m^2 and functions as an acoustic matching layer.

Claim 18 (Currently Amended): The ultrasonic probe according to claim 2, further comprising an upper resin layer which is formed on an upper surface of the piezoelectric member, the upper surface being the acoustically emitting side, and which has smaller acoustic impedance than the piezoelectric member, ~~an excellent cutting characteristic, an excellent conductivity, functions as an electrode, has an acoustic impedance of @ MRayl to 10 MRayl, and functions as a an acoustic matching layer~~ a cutting characteristic and electrical conductivity so as to function as an electrode, an acoustic impedance of 2×10^6 g/m^2 to 10×10^6 g/m^2 and functions as an acoustic matching layer.